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A Study into the Role of International Collaborations in Higher Education to Enhance Research Capacity for Disaster Resilience

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Abstract

International collaborations in the context of Disaster Resilience (DR) is pivotal due to several reasons. It helps to propose ways to create more coherent international approaches on disaster risk reduction, climate change adaptation and resilience strengthening; it helps to enhance risk management capabilities by bridging the gap between science and legal/policy issues; it helps to address the issue of efficient management of trans-boundary crises. The need to optimise international cooperation in relation to resourcing research, capacity building to undertake research and facilitating its uptake is mentioned throughout the Sendai Framework for disaster risk reduction 2015-2030 (SFDRR). Given their different capacities, as well as the linkage between the level of support provided to them and the extent to which they will be able to implement the SFDRR, developing countries require an enhanced provision of means of implementation, including adequate, sustainable and timely resources, through international cooperation and global partnerships for development, and continued international support, so as to strengthen their efforts to reduce disaster risk. The purpose of this paper is to examine the level of engagement of Higher Education Institutions (HEIs) in developing countries in Asia in international collaborations to improve their Research and Innovation (R&I) capacities in DR. Based on a project entitled ASCENT (Advancing Skills Creation and Enhancement), the findings of the paper focuses on three Asian countries, i.e. Bangladesh, Sri Lanka and Thailand. Other than an extant literature review, the paper findings are drawn from a questionnaire survey carried out in eight HEIs from the said countries. There are already several regional initiatives that promote collaboration among HEIs towards building resilience. These networks should be supported and encouraged to grow. These global networks should collaborate with existing bodies to ensure that the role of higher education is understood and can be made use of. Findings of this paper supports the need for an enhanced international partnership to improve the science-policy interface in DR and to achieve the objectives of the SFDRR.

Peer-review under responsibility of the scientific committee of the 7th International Conference on Building Resilience.

Keywords: Barriers; Disaster Resilience (DR); Higher Education Institutions (HEIs); International Collaboration; Research and Innovation (R&I)

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1. International collaborations and EU's role

The first collaborative scientific paper was published in 1665 [1] and the number of collaborative papers has increased ever since, first slowly, then dramatically after the middle of the eighteenth century [2]. Beaver and Rosen noted collaborative linkages across national borders as early as the nineteenth century [1]. These linkages increased toward the end of the century, and international collaboration has grown in importance throughout the present century [2]. International collaboration in science can be considered as a communications network that is different from national systems and has its own internal dynamics [3]. International collaboration in research can take many forms; the sharing of unique data sources, correspondence by mail, exchanges of ideas at conferences, visits to foreign laboratories, ex- change of papers and collaborate in writing research papers [4], and corresponding and exchanging ideas through ICT – Information and Communication Technologies (e.g. e-mail, Skype, teleconferencing).

As scientific capacity continues to grow around the world, and more links are made among countries, the flow of knowledge among them may also grow [5]. International collaborations help cross border strategic decisions making while creating win-win situations to all parties involved. Shared understanding, trust and commitment of the parties involved act as enablers for the success of international collaborations. However, international collaboration is not without criticism. For an example, according to a recent research, Africa's heavy dependency on international collaboration may be stifling research individualism and affecting the continent's research evolution and priorities, e.g. single author articles appear to be "on the verge of extinction" [6].

National systems have policies and institutions that mediate scientific communication, while at the global level the network exists primarily as a self-organizing system. The exception here is the European Union (EU), where specific incentives exist to encourage formal international linkages among member countries [5]. EU has a long history in promoting research cooperation across borders. Established in 1954, the European Organization for Nuclear Research (CERN) is a research centre of excellence and the world's largest particle physics laboratory, attracting top scientists. Since 1986, the Treaties explicitly identify cooperation with third countries as a key activity of the Union's research policy. The Framework Programmes have gradually been opened up to participation by third countries, with support for international cooperation fully mainstreamed within FP7. One of the conclusions of the FP7 interim evaluation [7] stated that there needs to be an '*intensification of international cooperation*' activities focused on '*engaging with partners outside of Europe on equal terms and in programmes and activities of high mutual interest*'. The same report [7] recommended the '*coherent strategic development*' of the Union's policy for international cooperation in research and innovation. While this progress is welcome, critical mass is lacking in many cases and the strategy driving the development of the actions is not always clear. There has been growing recognition of a need to enhance international cooperation on activities focused on 'engaging with partners outside of Europe on equal terms and in programmes and activities of high mutual interest' [7]. The need for linkages with Asian countries has been emphasized given the region's rapidly growing research and innovation (R&I) on capacities and the urgency to address global challenges.

British Council [8] examines the barriers that prevent South Asian experts from linking up with research colleagues across the globe to create opportunities for collaborative research, and recommends action to address them. Based on a series of interviews conducted with global experts in 2014, the paper aims to be a guide for researchers and policy makers interested in unlocking the region's collaborative research potential. Universities, institutes and local research and development (R&D) agencies in the South Asian region lag behind their counterparts in the rest of Asia in terms of R&D and technological enhancement activities, confirming the need for governments and firms to rethink their policies and strategies in this regard [8]. The need for linkages with Asian countries was particularly highlighted given the region's rapidly growing research and innovation capacities and the urgency to address South Asia, which is home to more than 40% of the world's absolute poor, will contribute nearly 40% of the growth in the world's working-age population over the next several decades. The potential remains very strong and South Asia continues to represent an exciting 'frontier market' for international research institutions. Priorities for EU-South Asia cooperation in research and innovation can include a wide ranging opportunities for real breakthrough research and radical innovation on in response to societal challenges for example [10]. Situation is equally true in Thailand too.

2. International collaboration in the context of Disaster Resilience

International collaborations in the context of Disaster Resilience (DR) is pivotal due to several reasons. It helps to propose ways to create more coherent international approaches on disaster risk reduction, climate change adaptation and resilience strengthening; it helps to enhance risk management capabilities by bridging the gap between science and legal/policy issues; it helps to address the issue of efficient management of trans-boundary crises [11]. Many catastrophic events have a trans-national impact and the issue of trans-boundary crisis as a major criticality. Such a cross-boundary approach will allow us to propose ways to mitigate the differences, to identify gaps, and to overcome the boundaries between different topics. Each boundary identifies a barrier of the risk reduction problem that must be overcome to properly define sound innovative plans for emergency management [11]. Societies have become more and more vulnerable and exposed to risk in an uneven way and a need for more coherent approach within a strong risk reduction innovative frame and a contribution to a new strategy for future research activities going beyond the traditional risk concepts and including resilience across boundaries.

3. Sendai Framework for Disaster Risk Reduction and increased International Collaboration

At the international level, work on DR is drawn together under the Sendai Framework for disaster risk reduction 2015-2030 (SFDRR) [12], adopted by United Nations (UN) Member States at the third UN world conference on disaster risk reduction in March 2015, and endorsed by the UN General Assembly. SFDRR is the basis for a disaster risk-informed and resilient sustainable development agenda. It represents a shift in the policy approach at the global level from disaster management to disaster risk management: the goal is to prevent new and reduce existing disaster risks, through an all-of-society and all-hazards risk approach across economic, social, and environmental policy areas, with a view to reduce vulnerability and increase resilience. States, their national and local authorities, regional and international organizations and other stakeholders, are invited to implement the four priorities of the Sendai Framework. Seven agreed global targets, most of which should be achieved by 2030, will be measured globally by appropriate indicators to contribute to the implementation of the priorities [13].

The SFDRR emphasizes that increased international cooperation between countries and organizations is considered essential to augment domestic resources and capabilities, particularly in countries where losses are disproportionately greater. This will help ensure adequate means of implementation in terms of capacity-building, financial resources and technical assistance. In this context, SFDRR calls for strengthening international cooperation to support efforts to build capacity in developing countries [13] and international cooperation to mobilize support for the provision of the means of implementation. The SFDRR provides a strong set of thirteen guiding principles to inform the framework's overall development and implementation and effective global partnerships and strengthened international cooperation is one of them, aiming at substantially enhance international cooperation to developing countries through adequate and sustainable support to complement their national actions for implementation of the framework by 2030 [13]. There is also recognition that a stronger dialogue and collaboration of policymakers, practitioners, and the science and technology community from all geographical regions, all disciplines, and all local, national, regional, and international levels will support better DRR by identifying knowledge gaps, co-designing and co-producing knowledge, and making science more readily available and accessible to support DRR decision making on the ground [13].

In this context, SFDRR recognizes the different capacities amongst high and low income countries to reduce disaster risk and calls for enhanced international cooperation. Developing countries are identified as needing greater external support in terms of capacity building, financial and technical support and technology transfer to augment domestic resources and capabilities [14]. There is therefore a need to recognize the capacities of different countries and greater recognition of the need for assistance. Capacity development to ensure that all countries can produce, access, and effectively use scientific information is one of the key components in this process. The need to optimize national and international cooperation in relation to resourcing research, capacity building to undertake research and facilitating its uptake is mentioned throughout the Sendai Framework. Given their different capacities, as well as the linkage between the level of support provided to them and the extent to which they will be able to implement the Sendai Framework, developing countries require an enhanced provision of means of implementation, including

adequate, sustainable and timely resources, through international cooperation and global partnerships for development, and continued international support, so as to strengthen their efforts to reduce disaster risk [12].

4. Role of Higher Education Institutions (HEIs) in increased International Collaboration

The role of HEIs remains unchallenged in the area of research training. Changes in the investment priorities in education has resulted in a decline of higher education and research in developing countries. There is a need for reviving and strengthening the university system in developing countries to strengthen their research capacities. Progress in risk reduction and resilience building is uneven across the world, with some high-risk, low-capacity countries falling behind. There is also uneven progress by hazard type and sub region [12]. This change should be reflected in the need to engage more actively and strategically in international cooperation and its importance associated with higher education research, and in the provision of opportunities to expand opportunities in engaging research, which are global. They need to join forces globally to tackle global challenges. The rationale for internationalization lies in an understanding of the universal nature of the advancement of knowledge. While knowledge is often contextual, the advancement of human knowledge that is based on the common bonds of humanity is arguably a global enterprise [15]. In the case of higher education, "Internationalization is defined as the process of integrating an international, intercultural, or global dimension into the purpose, functions or delivery of postsecondary education" [16]. Internationalization means creating an environment that is international in character in teaching, in research, and in outreach. All good universities combine local and regional research and engagement with a strong international presence.

British Council [8] has examined the barriers that prevent South Asian experts from linking up with research colleagues across the globe to create opportunities for collaborative research, and recommends action to address them. South Asia's research capacity has been increasing but international collaborations between authors still have much to grow. There is great potential to help fill the gap between capacity and demand. Universities have a highly important implication of capabilities management for disasters. International collaborations for exploring integrated disaster risk management involves cooperating with innovative researchers working in the field of disaster science at leading institutions around the world. This function (amongst others) is served by collaborations on state-of-the-art DR methods; collaborations on disaster counter-measures, focusing on practical approaches for a variety of socio-cultural environments; and collaborations on social implementation of disaster management methods in disaster-prone countries; and collaborations on development of knowledge and methods of common disaster related issues for Japan and countries [17].

There are already several regional initiatives that promote collaboration among higher education towards building resilience. These networks should be supported and encouraged to grow. These global networks should collaborate with existing bodies (such as the UNISDR Scientific and Technical Advisory Group) to ensure that the role of higher education is understood and can be exploited [18]. Many universities in the developed world have a positive record of internationalization; they have facilitated the development of international curricula and joint degrees, fostered international innovation projects, and supported the exchange of students, staff, and knowledge. This type of international cooperation will be vital to address the complex challenges associated with tackling disaster risk, as well as in ensuring that less developed regions and countries are not left behind [18]. This is what the project entitled ASCENT (Advancing Skills Creation for Enhancing Transformation) is trying to achieve [19]. An opportunity exists across international fora for collaboration from the broad range of sectors. Evidence reveals that this is an area that can have an influence on DR.

5. Research methodology

The ASCENT project is a collaboration between several EU countries and three Asian countries (i.e. Bangladesh, Sri Lanka and Thailand) in order to strengthen the R&I capacity in DR in eight HEIs (3 from Bangladesh; 03 from Sri Lanka; and 02 from Thailand) from the said Asian countries. The purpose of this paper is to present findings emerged from a questionnaire survey, administered in identifying research and innovative capacity needs across target universities in Bangladesh, Sri Lanka and Thailand to tackle the development of societal resilience to disasters. In total, 530 responses (but the number of responses varied for some of the questions) were received at the end of the

survey. The respondents were academic and research staff within 08 partner HEIs involved in the project. The data was analysed mainly using descriptive statistics and cross tabulation. The analysis focused on identifying the level of involvement in international collaboration, and the barriers that hinder international collaboration in R&I in DR in the chosen countries. The purpose of the analysis, amongst others, was to develop research capacity-building programmes for the selected HEIs to improve the development of societal resilience to disasters.

6. Findings – Level of International Collaboration and Related Barriers

Collaboration can take various forms ranging from offering general advice and insights to active participation in a specific piece of research [20]. There is also a consensus that multiple-authorship provides strong evidence of collaboration [3]. Therefore, for the ASCENT project, two main closed questions, with a binary option (Yes/No), to examine the level of involvement in international collaboration in R&I in DR activities were asked from the respondents, i.e. involvement in international research projects, and whether the partners have authored (or co-authored) publications with international partners. The overall findings emerged from the questionnaire analysis, using a cross-tabulation, are presented in following Table 1. To examine whether the level of involvement in international collaboration differs according to respondents' profile, findings are categorized according to country, gender and years of experience. Herein, not only the frequency of Yes or No answers are given within the table, but it also gives the percentage of responses to identify the significance of the answers. For an example, for the cross-tab between staff experience and their level of involvement in research projects, 57 respondents who have less than 5 years' experience have stated 'yes' to their involvement, whereas only 21 respondents who have more than 20 years' experience have stated the same. This does not indicate that staff who are less experienced have more involvement in international research projects as the 57 respondents come from 268 respondents (19%), whereas the 21 experienced respondents come from a total of only 51 respondents (41%).

Table1: Cross-Tabulation results for Level of International Collaboration

Answer	Overall	Country*				Gender*				Experience in Years					
		Ban	SL	Thai	Total	NS	M	F	Total	0-5	6-10	11-15	16-20	Over 20	Total
Question 1: Staff's level of involvement in international research projects															
No	189 (36%)	57 (30%)	59 (35%)	73 (42%)	189	1 (33%)	106 (33%)	82 (41%)	189	114 (43%)	29 (31%)	17 (25%)	16 (33%)	13 (26%)	189
Yes	138 (26%)	48 (26%)	43 (25%)	48 (28%)	139	1 (33%)	96 (29%)	42 (21%)	139	57 (21%)	29 (31%)	15 (22%)	17 (34%)	21 (41%)	139
(Blank)	203 (38%)	83 (44%)	68 (40%)	51 (30%)	202	1 (33%)	124 (38%)	77 (38%)	202	97 (36%)	36 (38%)	36 (53%)	16 (33%)	17 (33%)	202
Total	**530 (100%)**	**188 (100%)**	**170 (100%)**	**172 (100%)**	**530**	**3 (100%)**	**326 (100%)**	**201 (100%)**	**530**	**268 (100%)**	**94 (100%)**	**68 (100%)**	**49 (100%)**	**51 (100%)**	**530**
Question 2: Whether the staff authored (or co-authored) publications with international partners															
No	168 (32%)	53 (28%)	59 (35%)	56 (32%)	168	1 (33%)	91 (28%)	76 (38%)	168	120 (45%)	19 (20%)	10 (15%)	12 (24%)	7 (14%)	168
Yes	159 (30%)	52 (28%)	43 (25%)	65 (38%)	160	1 (33%)	111 (34%)	48 (24%)	160	51 (19%)	39 (42%)	22 (32%)	21 (43%)	27 (53%)	160
(Blank)	203 (38%)	83 (44%)	68 (40%)	51 (30%)	202	1 (33%)	124 (38%)	77 (38%)	202	97 (36%)	36 (38%)	36 (53%)	16 (33%)	17 (33%)	202
Total	**530 (100%)**	**188 (100%)**	**170 (100%)**	**172 (100%)**	**530**	**3 (100%)**	**326 (100%)**	**201 (100%)**	**530**	**268 (100%)**	**94 (100%)**	**68 (100%)**	**49 (100%)**	**51 (100%)**	**530**

*** Country:** Ban – Bangladesh, SL – Sri Lanka, Thai – Thailand; **Gender:** NS – Not Specified, M – Male, F – Female

Of the 530 respondents participated for the survey, only 327 (62%) filled in question 1, and only 328 filled in question 2 mentioned above. Since these two questions were easy to fill in, one of the main reasons the rest of the 38% staff may not have filled in the questionnaire maybe down to their lack of knowledge or lack of engagement in international collaboration. This is further proven as only about a quarter of the respondents (approx. 26%) are involved in international research projects. Further, only less than a third of the respondents (approx. 30%) have authored or co-authored publications with international partners. Therefore, immediate steps need to be taken in promoting international collaborations within HEIs in the three Asian countries. Herein, it is also worth noting that,

in terms of level of staff involvement in international research projects were, moreover, similar in all three countries (approx. average 26%). On the other hand, the Thai partners, comparatively, had a higher level of involvement (approx. 38%) with international partners in authoring or co-authoring publications. Authoring in joint publications with international partners need to be further promoted, as it is becoming one of the main indicators of evaluating the level of international collaboration [21].

From the findings it is apparent that, gender wise, male respondents had a relatively higher level of involvement in both international research projects (29%) and publication with international partners (34%), compared to their female counterparts. In the Asian region, social norms still appear to be prevailing, and thus can influence perceptions of a woman's capability [22]. Female staff need to be supported and encouraged more to increase the level of international collaboration in HEIs.

Staff who are very experienced, especially staff who have more than 20 years' experience in HEIs, are more involved in international research projects (41%) and in publishing with international collaborators (53%). In contrast, staff who have less than 5 years' experience have stated that they are neither involved in international research projects (43%) nor have authored or co-authored any publications with other international partners (45%). If more R&I needs to be carried out in DR activities within the HEIs, early career staff need to be encouraged and supported well within the HEIs, and should be provided with more opportunities for international collaboration.

An in-depth literature review and 213 qualitative interviews carried out as part of the initial stages of this ASCENT project revealed similar results to the above on lack of international collaboration. Therefore, it was necessary to identify the barriers that inhibit international collaboration in carrying out R&I in DR activities. Accordingly, five barriers were identified during the exploratory stage. They were language differences, cultural differences, finding partners with same research interests on DR, lack of Institutional support, and lack of networking opportunities. The respondents of the questionnaire survey were asked to rate their level of agreement, on a Likert scale of five, about the criticality of these five barriers that hinder international collaboration in R&I in DR. The overall findings are given in below Table 2.

Table 2: Overall findings of Criticality of Barriers

Level of Agreement	Language differences	Cultural differences	Finding partners with same research interests	Lack of Institutional support	Lack of networking opportunities
1 – Strongly Disagree	49 (15%)	48 (14%)	13 (4%)	5 (2%)	5 (2%)
2 - Disagree	125 (38%)	142 (43%)	73 (22%)	38 (11%)	53 (16%)
3 – Neither Agree nor Disagree	52 (16%)	88 (26%)	62 (19%)	48 (14%)	65 (20%)
4 - Agree	82 (25%)	46 (14%)	154 (46%)	169 (51%)	157 (47%)
5 – Strongly Agree	25 (8%)	9 (3%)	31 (9%)	73 (22%)	52 (16%)
Total of responses	333 (100%)				332 (100%)

Language and culture have a direct influence on the level of cooperation that can be achieved between parties. This affects not only the quality of communication, but the choice of communication media. For example, team members who are not confident with their English language skills may prefer instant messaging or email as text-based media provide more time to comprehend and compose a response; but text-based media may not convey important information such as how well a participant truly understands a conversation [23]. On the other hand, culture influences interpretation of communication. For example, polite expressions of acknowledgement by Asian partners can be misinterpreted as agreement or commitment by EU partners. Culture also interferes with collaboration when cultural norms result in conflicting approaches to problem solving [24]. However, according to the study findings, most respondents (53% and 57%) from the three Asian countries do not regard both language and cultural differences as main barriers of international collaboration (whereas only 33% and 17%, respectively, agreed that they are critical barriers). On the other hand, according to nearly a three-quarter of respondents (73%), lack of institutional support is the biggest barrier, closely followed by lack of networking opportunities (e.g. attending conferences) and findings partners with same interests in DR research.

To examine the findings further, a correlation exercise was carried out to identify whether the responses vary as per respondents' profiles. The findings are presented in Table 3. Overall, only very minor variations exist between the respondents according to country, gender, years of experience and staff category with regard to their level of

agreement on the criticality of barriers. Therefore, there is a unanimous agreement between different categories or type of staff members on the study findings. For an example, according to both research staff (e.g. research associates and research fellows) and academic staff (e.g. lecturers – L, senior lecturers – SL, professors, and readers/associate professors), the biggest barrier for international collaboration is lack of institutional support, whilst the least critical barrier is cultural differences. Few participants also mentioned financial regulations prevailed in the country, lack of personal capabilities and initiatives and lack of information on DR projects as 'other' barriers in the open-ended question asked about barriers that may have not been mentioned in the questionnaire. If R&I in DR needs to be promoted and improved in HEIs, necessary steps should be taken to overcome at least the main barriers of international collaboration (i.e. institutional support, findings partners with same research interests in DR, lack of networking opportunities).

Table 3: Criticality of Barriers as per Respondents' Profiles

Categories \ Barriers		Language differences*	Cultural differences*	Finding partners with same research interests*	Lack of Institutional support*	Lack of networking opportunities*
Country	Ban	2.13	2.22	3.24	4.08	3.81
	SL	2.51	2.33	3.18	3.68	3.50
	Thai	3.41	2.82	3.59	3.67	3.50
Gender	M	2.53	2.37	3.33	3.90	3.73
	F	3.06	2.66	3.39	3.66	3.38
Years of Experience	0-5	2.92	2.58	3.34	3.73	3.52
	6-10	2.47	2.25	3.27	3.78	3.63
	11-15	2.50	2.50	3.32	3.91	4.00
	15-20	2.68	2.50	3.47	3.74	3.52
	Over 20	2.44	2.29	3.44	4.18	3.62
Staff Category	L/SL	2.63	2.40	3.41	3.81	3.62
	Prof/Reader	2.25	2.22	3.23	4.12	3.77
	Research Post	3.36	2.89	3.30	3.53	3.39
Total Responses		333				332

* **Likert scale**: 1 – Strongly Disagree; 2 – Disagree; 3 – Neither Agree or Disagree; 4 – Agree; 5 – Strongly Agree

7. Conclusions

Findings of this paper supports the need for an enhanced international partnership to improve the science-policy interface in DR and to achieve the objectives of the Sendai Framework [12] and it highlights that national scientists of the target countries agree with this conclusion. It further highlights the need to have dialogue with university researchers to enable national capacity building. Such sustainable mechanisms can ensure long-term research collaborations with the countries and Higher Education Institutes (HEIs) that can cater DR needs of a country.

As identified through an extant literature review, the most obvious form of international collaboration - and the most easily measured - is collaboration in the writing of research findings, and participation in international research projects. However, the empirical results revealed that only a third of the staff members are involved in these activities. Findings further reveal that male staff and experienced staff members have a higher level of engagement in international collaboration compared to female staff and early career academics who have less than 05 years' experience. In addition, lack of institutional support was identified as the biggest barrier for international collaboration from the survey results. Lack of institutional support can be especially problematic to early career staff members as mentioned by Carr et al [24]. Given the fact that early career staff have the lowest level of engagement in international collaboration as well, having supportive collegial relationships, institutional support, job security [25], and funding can be critical facilitators to overcome the barriers for international collaboration. To fulfil this, HEIs need to be encouraged to take a strategic view on internationalization. There is also a need for them to encourage, motivate and incentivize their staff to work cooperatively with relevant DR agencies, nationally and internationally, to conduct R&I activities. Institutional policy, strategy, planning, communication and coordination of the HEIs in the three Asian countries are vital enablers to initiate research collaborations across different continents in the world.

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